MISSISSIPPI STATE UNIVERSITY

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17 December 1966

Mr. L. C. Fuhrmeister
Technical Services Superintendent
Monsanto Chemical Company
Anniston, Alabama 36202

Dear Mr. Fuhrmeister:

This will be a brief report of certain information requested by your people.

I. We have tested bluegills on phosphoric acid and hydrochloric acid. Fish survive at a pH 4 and died below that value, e.g.:

	H_3PO_4	HCl
pH = 1	All dead in 15 min	All dead in 15 min
pH = 2	All dead in 19 min	All dead in 20 min
pH = 3	All dead in 24 hrs	All dead in 24 hrs
pH = 4	Lived 36 hrs*	Lived 36 hrs*
pH = 5	Lived 36 hrs	Lived 36 hrs
pH = 6	Lived 36 hrs	Lived 36 hrs
pH = 7.3 (Control)	Lived 36 hrs	Lived 36 hrs

* These experiments were repeated and run 60 hours, the results were unchanged.

II. Several people have reported mercury to be toxic to fresh water fishes at concentrations of 0.01 ppm. Some species died in only 8 hours while others were able to survive up to 92 days. The mode of action of Hg is thought to be coagulation of mucous (protein-metal precipitate) on the gill surfaces. Thus, death may occur before absorption while the metal is only superficially accumulated.

Fish that avoid copper sulphate normally were unable to do so after being exposed to low concentrations of mecuric chloride. This observation may be a significant one in relation to our problems.

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III. We had bad luck with our cholinesterase determinations! Our tissue homogenizer broke and we attempted to substitute a mortar and pestle. This method failed to extract the enzyme. We returned to Anniston December 10 for more fish but could not get to the cages because of flood water. We are all set to try again this weekend.

IV. Our Microbiology Department is presently running tests on the microfauna of Choccolocco Creek.

V. Analyses of water samples collected October 10, 1966 produced the following findings (expressed as parts per billion):

Collection Site	Pesticides
Choccolocco Creek - 4 miles E. Boiling Spring	DDT .40 DDE .40 DDD .10 Parathion* 4 unidentified peaks
Anniston Sewage Treatment Plant	DDT .20 DDE .33 DDD .21 Methyl Parathion .70 Parathion* 6 unidentified peaks
Choccolocco Creek - 1 mile upstream from mouth of Coldwater Creek	DDT .40 DDE .46 DDD Trace BHC Trace Methyl Parathion .50 Parathion* 4 unidentified peaks
Monsanto Treatment Facility	Methyl Parathion .37 Parathion*
Snow Creek (near Oxford at Highway 21 - Highway 78 cut-off)	Many peaks - as in previous samples from this site - no identifications could be made.

* A peak having the same retention time as parathion appeared in these samples. When the sample from the Monsanto Treatment Plant was chromatographed by thin-layer, a dark spot (Rf value = .50) and a light

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spot (Rf = .12) appeared. A parathion standard also had an Rf of .12. Materials from the unidentified spots were collected, dissolved in hexane, and each was chromatographed (GLC) using a D C - 200 column. Retention times were identical for the two substances. Although one of the materials is almost certainly parathion, no quantitations could be done on samples collected from thin-layer plates. We are conditioning a new polar column which should separate these two peaks.

Other water and fish samples are being processed.

VI. I hope the reprints on DO were useful.

Sincerely yours,

Denzel E. Ferguson
Professor of Zoology

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